Small Business Innovation Research/Small Business Tech Transfer

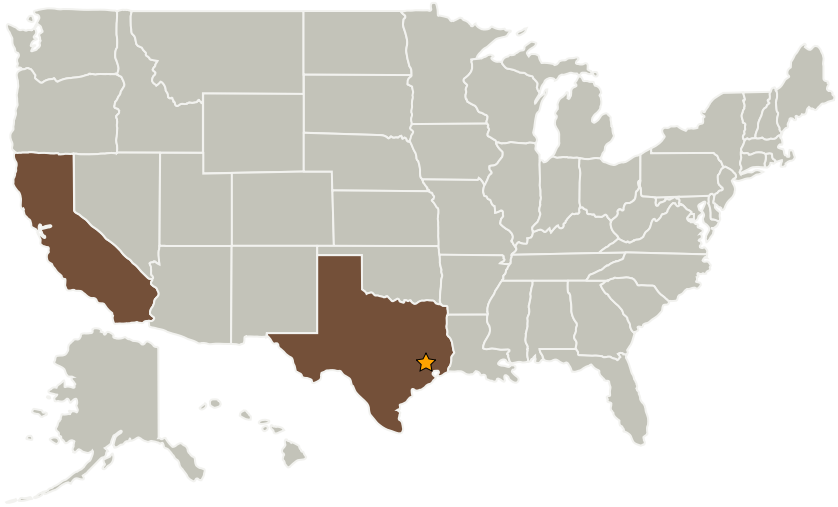
One Component Encapsulating Material Matrix as High Barrier Coating, Phase I

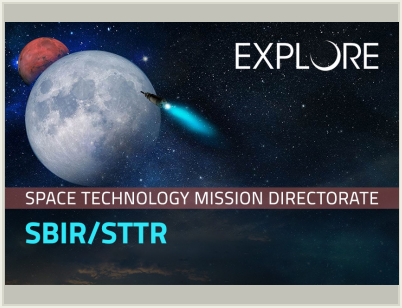
Completed Technology Project (2007 - 2007)

Project Introduction

To address the NASA need for new flexible food packaging materials with effective high barrier against oxygen and moisture to protect food, minimize weight and waste, and ensure a shelf life of 3-5 years for NASA future exploration missions to the Moon and Mars, Luminit, LLC proposes to develop a new One-Component Encapsulating (ONCE) material matrix based on hybrid sol-gel technology. ONCE brings together a new chemical synthesis of sol-gel, polymer, and zirconium-dioxide nanoparticles to form a coating, which has excellent water vapor barrier properties, with a unique combination of sol-gel and polymer nanocomposite matrix in a transparent, flexible, and UV-curable conformal coating that meets the NASA requirements: high barrier flexible packaging coatings that protect from oxygen and water vapor; less mass and volume; no metallic components; transparent; heat sealable; microwavable; and they maintain the foods' 3-5 year shelf life. In Phase I Luminit will develop a polymer-based glass-like sol-gel ONCE encapsulated coating for high barrier flexible packaging materials, and demonstrate its resistance to oxygen and water vapor, 100 mg per square meter per day. Phase II will scale up and optimize the ONCE process to cost efficiently produce ONCE material matrices for more comprehensive oxygen and water vapor resistance.

Primary U.S. Work Locations and Key Partners





One Component Encapsulating Material Matrix as High Barrier Coating, Phase I

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

One Component Encapsulating Material Matrix as High Barrier Coating, Phase I

Completed Technology Project (2007 - 2007)

Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Luminit, LLC	Supporting Organization	Industry	Torrance, California

Primary U.S. Work Locations	
California	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.5 Coatings